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Safeguarding Data in the Digital Era: A Study on Cryptography

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Abstract: *Cryptography provides secure communication in computer systems by transforming readable information into encrypted forms that are readable only by privileged users. This paper is a critical examination of traditional and contemporary cryptographic techniques, namely Advanced Encryption Standard (AES), Rivest–Shamir– Adleman (RSA), and Elliptic Curve Cryptography (ECC).*
In the fast-changing digital age, data security has emerged as a major issue because of the explosive growth in data creation, storage, and transmission. With the growing sophistication and frequency of cyber attacks, it is imperative to maintain the confidentiality, integrity, and availability of information. Cryptography, the study of encrypting and securing information, is an integral part of protecting digital data. This paper discusses some of the various cryptographic methods—symmetric and asymmetric encryption, hashing, and digital signatures—and their use in contemporary digital systems. It also studies the use of cryptography in upcoming technologies such as cloud computing, blockchain, and the Internet of Things (IoT)..

Keywords: Cryptography, AES, RSA, ECC, Post- Quantum Cryptography, Network Security, Blockchain, IoT Security

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